

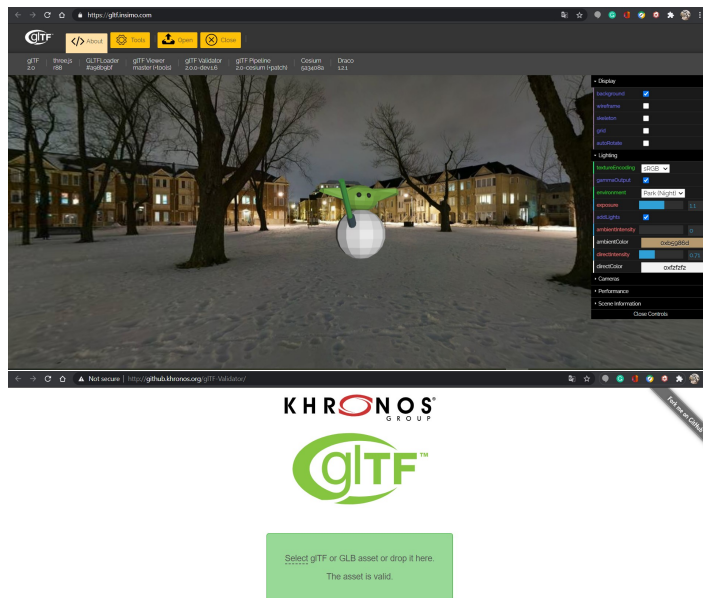
CS460 Fall 2020

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## Assignment 10: glTF!

We will load our favorite mesh from a file and then convert it to a valid glTF file. You can choose if you want to do this assignment in JavaScript or in Python. In class, we will use Python (see example colab <https://cs460.org/shortcuts/33/>).



**Starter code for assignment 10.** After pulling from upstream, there is the folder 10 in your fork. This folder contains an `index.html` file that uses JavaScript to make glTF JSON. This folder also contains a `gltf.py` script that you can run with `python gltf.py` to output the glTF JSON. As a start for this assignment, both versions create an identical valid glTF JSON structure holding a single triangle (see screenshot above).

**Part 1 (1 points):** Please decide which language you will use: JavaScript or Python. Python might be a bit easier to load and parse an existing file—with JavaScript we need to use Ajax to load the existing mesh and parse it (or as option 3: use a Three.js loader and grab the vertices/indices from there). For parsing files with Python look here: <https://tutorial.eyehunts.com/python/python-read-file-line-by-line-readlines/> For using Javascript and Ajax look here: [https://developer.mozilla.org/en-US/docs/Web/API/XMLHttpRequest/Using\\_XMLHttpRequest](https://developer.mozilla.org/en-US/docs/Web/API/XMLHttpRequest/Using_XMLHttpRequest).

**Part 2 (15 points):** Load a mesh from an external file. A .PLY or .OBJ file might be the easiest to parse.

**Part 3 (20 points):** Parse all vertices from the loaded mesh and create the VERTICES array and base64 code.

**Part 4 (20 points):** Parse all indices from the loaded mesh and create the INDICES array and base 64 code.

**Part 5 (10 points):** Calculate all required fields for the glTF file (as we did in class) and generate the glTF JSON code. Store the glTF JSON code in a glTF file.

**Part 6 (5 points):** Please make sure the glTF file is valid using <http://github.khronos.org/glTF-Validator/>.

**Part 7 (5 points):** Visualize the glTF file using <https://gltf.insimo.com/>. You might have to choose the wireframe display option since the glTF file does not include material (Display -> Wireframe, in the dat.GUI). **Please replace the screenshot above.**

**Part 8 (5 points):** Add the glTF file to your fork.

**Part 9 (10 points):** Choose a final project—either an existing one from <https://cs460.org/assignments/final/> or a new one. Please list the project here and in the link. If working as a team, assemble your team and list the team members below and in the link.

**Shadow mapping in a 3D WebGL model:** Making animation in which a moving light casts shadow of objects around.

**Part 10 (9 points):** Make sure this PDF and your glTF file are in your fork on github. Then, please send a pull request.

**Bonus (33 points):**

**Part 1 (15 points):** Please add any kind of material to the glTF file. For this, you would have to read the specs or google for examples :)

**Part 2 (18 points):** Write THREE.js code that displays your glTF file using the `THREE.GLTFLoader`.